

## **CHAPTER 5**

### **WATER QUALITY PARTNERSHIPS IN THE FORT LOUDOUN LAKE WATERSHED**

- 5.1. Background.**
- 5.2. Federal Partnerships**
  - 5.2.A. Natural Resources Conservation Service**
  - 5.2.B. United States Geological Survey**
  - 5.2.C. United States Fish and Wildlife Service**
  - 5.2.D. Tennessee Valley Authority**
  - 5.2.E. National Park Service**
- 5.3. State Partnerships**
  - 5.3.A. TDEC Division of Water Supply**
  - 5.3.B. State Revolving Fund**
  - 5.3.C. Tennessee Department of Agriculture**
- 5.4. Local Initiatives**
  - 5.4.A. Tennessee Izaak Walton League**
  - 5.4.B. Little River Watershed Association**
  - 5.4.C. Blount County Planning Commission**

**5.1. BACKGROUND.** The Watershed Approach relies on participation at the federal, state, local and nongovernmental levels to be successful. Two types of partnerships are critical to ensure success:

- Partnerships between agencies
- Partnerships between agencies and landowners

This chapter describes both types of partnerships in the Fort Loudoun Lake Watershed. The information presented is provided by the agencies and organizations described.

## 5.2. FEDERAL PARTNERSHIPS.

**5.2.A. Natural Resources Conservation Service.** The Natural Resources Conservation Service (NRCS), an agency of the U.S. Department of Agriculture, provides technical assistance, information, and advice to citizens in their efforts to conserve soil, water, plant, animal, and air resources on private lands.

Performance & Results Measurement System (PRMS) is a Web-based database application providing USDA Natural Resources Conservation Service, conservation partners, and the public fast and easy access to accomplishments and progress toward strategies and performance. The PRMS may be viewed at <http://prms.nrcs.usda.gov/prms>. From the opening menu, select "Reports," then select the Conservation Treatment of interest on the page that comes up. Select the desired location and time period from the drop down menus and choose "Refresh." Choose "by HUC" in the "Location" option and choose "Refresh" again.

The data can be used to determine broad distribution trends in service provided to customers by NRCS conservation partnerships. These data do not show sufficient detail to enable evaluation of site-specific conditions (e.g., privately-owned farms and ranches) and are intended to reflect general trends.

CONSERVATION PRACTICE	TOTAL
Comprehensive Nutrient Management Plans (Number)	2
Conservation Buffers (Acres)	29
Erosion Reduction (Tons/Year)	19,191
Inventory and Evaluations (Number)	17
Irrigation Management (Acres)	0
Nutrient Management (Acres)	1,753
Pest Management (Acres)	2,690
Prescribed Grazing (Acres)	994
Residue Management (Acres)	1,240
Tree and Shrub Practices (Acres)	1,099
Waste Management (Number)	3
Wetlands Created, Restored, or Enhanced (Acres)	0
Wildlife Habitat (Acres)	1,596

**Table 5-1. Landowner Conservation Practices in Partnership with NRCS in the Fort Loudoun Lake Watershed.** Data are from PRMS for October 1, 2001 through September 30, 2002 reporting period. More information is provided in Fort Loudoun-Appendix V.

**5.2.B. United States Geological Survey Water Resources Programs – Tennessee District.** The U.S. Geological Survey (USGS) provides relevant and objective scientific studies and information for public use to evaluate the quantity, quality, and use of the Nation's water resources. In addition to providing National assessments, the USGS also conducts hydrologic studies in cooperation with numerous Federal, State, and local agencies to address issues of National, regional, and local concern. Please visit <http://water.usgs.gov/> for an overview of the USGS, Water Resources Discipline.

The USGS collects hydrologic data to document current conditions and provide a basis for understanding hydrologic systems and solving hydrologic problems. In Tennessee, the USGS records streamflow continuously at more than 89 gaging stations equipped with recorders and makes instantaneous measurements of streamflow at many other locations. Ground-water levels are monitored Statewide, and the physical, chemical, and biologic characteristics of surface and ground waters are analyzed. USGS activities also include the annual compilation of water-use records and collection of data for National baseline and water-quality networks. National programs conducted by the USGS include the National Atmospheric Deposition Program (<http://bqs.usgs.gov/acidrain/>), National Stream Quality Accounting Network (<http://water.usgs.gov/nasgan/>), and the National Water-Quality Assessment Program (<http://water.usgs.gov/nawqa/>).

USGS Water Resources Information on the Internet. Real-time and historical streamflow, water levels, and water-quality data at sites operated by the Tennessee District can be accessed at <http://waterdata.usgs.gov/tn/nwis/nwis>. Data can be retrieved by county, hydrologic unit code, or major river basin using drop-down menus. Contact Donna Flohr at (615) 837-4730 or [dfflohr@usgs.gov](mailto:dfflohr@usgs.gov) for specific information about streamflow data.

Recent publications by the USGS staff in Tennessee can be accessed by visiting <http://tn.water.usgs.gov/pubpg.html>. This web page provides searchable bibliographic information to locate reports and other products about specific areas.

**5.2.C. U.S. Fish and Wildlife Service.** The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people. Sustaining our nation's fish and wildlife resources is a task that can be accomplished only through the combined efforts of governments, businesses, and private citizens. The U.S. Fish and Wildlife Service (Service) works with State and Federal agencies and Tribal governments, helps corporate and private landowners conserve habitat, and cooperates with other nations to halt illegal wildlife trade. The Service also administers a Federal Aid program that distributes funds annually to States for fish and wildlife restoration, boating access, hunter education, and related projects across America. The funds come from Federal excise taxes on fishing, hunting, and boating equipment.

*Endangered Species Program.* Through the Endangered Species Program, the Service consults with other federal agencies concerning their program activities and their effects on endangered and threatened species. Other Service activities under the Endangered Species Program include the listing of rare species under the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended: 16 U.S.C. 1531 et seq.) and the recovery of listed species. Once listed, a species is afforded the full range of protections available under the ESA, including prohibitions on killing, harming or otherwise taking a species. In some instances, species listing can be avoided by the development of Candidate Conservation Agreements, which may remove threats facing the candidate species, and funding efforts such as the Private Stewardship Grant Program. For a complete listing of endangered and threatened species in the Ft. Loudon Lake watershed, please visit the Service's website at <http://www.cookeville.fws.gov>.

Recovery is the process by which the decline of an endangered or threatened species is stopped and reversed, and threats to the species' survival are eliminated, so that long-term survival in nature can be ensured. The goal of the recovery process is to restore listed species to a point where they are secure and self-sustaining in the wild and can be removed from the endangered species list. Under the ESA, the Service and National Marine Fisheries Service were delegated the responsibility of carrying out the recovery program for all listed species.

In a partnership with the Tennessee Nature Conservancy (TNC), Tennessee Wildlife Resources Agency (TWRA), and Tennessee Department of Environment and Conservation (TDEC) Division of Natural Heritage, the Service is developing a State Conservation Agreement for Cave Dependent Species in Tennessee (SCA). The SCA targets unlisted but rare species and protects these species through a suite of proactive conservation agreements. The goal is to preclude the need to list these species under the ESA. This agreement will cover middle and eastern Tennessee and will benefit water quality in many watersheds within the State.

In an effort to preclude the listing of a rare species, the Service engages in proactive conservation efforts for unlisted species. The program covers not only formal candidates, but other rare species that are under threat. Early intervention preserves management options and minimizes the cost of recovery.

*Partners for Fish and Wildlife Program.* The U.S. Fish and Wildlife Service established the Partners for Fish and Wildlife Program to restore historic habitat types which benefit native fishes and wildlife. The program adheres to the concept that restoring or enhancing habitats such as wetlands or other unique habitat types will substantially benefit federal trust species on private lands by providing food and cover or other essential needs. Federal trust species include threatened and endangered species, as well as migratory birds (e.g. waterfowl, wading birds, shorebirds, neotropical migratory songbirds).

Participation is voluntary and various types of projects are available. Projects include livestock exclusion fencing, alternate water supply construction, streambank stabilization, restoration of native vegetation, wetland restoration/enhancement, riparian zone reforestation, and restoration of in-stream aquatic habitats.

*How To Participate:*

- Interested landowners contact a "Partners for Fish and Wildlife" Biologist to discuss the proposed project and establish a site visit.
- A visit to the site is then used to determine which activities the landowner desires and how those activities will enhance habitat for trust resources. Technical advice on proposed activities is provided by the Service, as appropriate.
- Proposed cost estimates are discussed by the Service and landowner.
- A detailed proposal which describes the proposed activities is developed by the Service biologist and the landowner. Funds are competitive, therefore the proposal is submitted to the Service's Ecosystem team for ranking and then to the Regional Office for funding.

- After funding is approved, the landowner and the Service co-sign a Wildlife Extension Agreement (minimum 10-year duration).
- Project installation begins.
- When the project is completed, the Service reimburses the landowner after receipts and other documentation are submitted according to the Wildlife Extension Agreement.

For more information regarding the Endangered Species and Partners for Fish and Wildlife programs, please contact the Cookeville Ecological Services Field Office at 931/528-6481 or visit their website at <http://www.cookeville.fws.gov>.

**5.2.D. Tennessee Valley Authority (TVA).** Tennessee Valley Authority's (TVA) goals for the 21st century are to generate prosperity for the Tennessee Valley by promoting economic development, supplying low-cost, reliable power, and supporting a thriving river system. TVA is committed to the sustainable development of the region and is engaged in a wide range of watershed protection activities. TVA formed 11 multidisciplinary Watershed Teams to help communities across the Tennessee Valley actively develop and implement protection and restoration activities in their local watersheds. These teams work in partnership with business, industry, government agencies, and community groups to manage, protect, and improve the quality of the Tennessee River and its tributaries. TVA also operates a comprehensive monitoring program to provide real-time information to the Watershed Teams and other entities about the conditions of these resources. The following is a summary of TVA's resource stewardship activities in the Fort Loudoun watershed.

## MONITORING

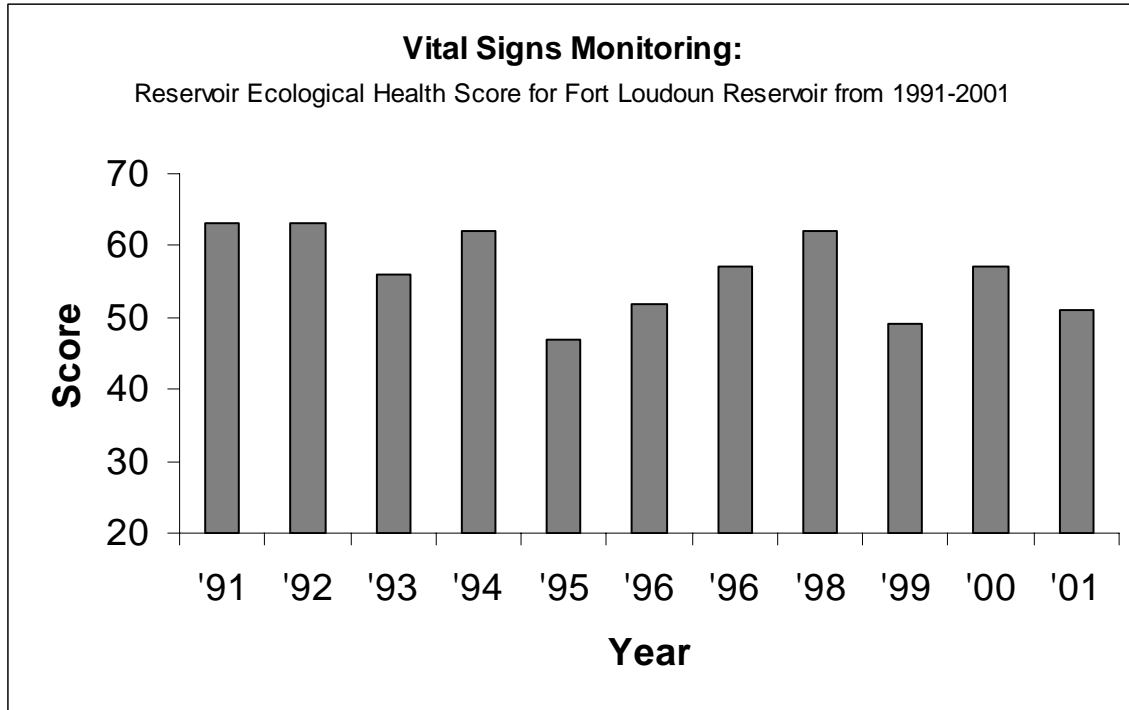
### *Vital Signs Monitoring*

**Reservoir Monitoring:** TVA has monitored the quality of water resources of Fort Loudoun Reservoir regularly as part of its Vital Signs Monitoring effort since 1991. Physical, chemical, and biological indicators (dissolved oxygen, chlorophyll, sediment chemistry, benthos, and fish) provide information from various habitats on the ecological health of the reservoir. These parameters are sampled at the forebay station near Fort Loudoun Dam (TRM 605.5), at mid-reservoir (TRM 624.6), and at the inflow station downstream of the confluence of the Holston and French Broad Rivers (TRM 652).

Numeric ratings are given to all of the indicators sampled at each station. The lowest possible rating for any indicator is 1 (poorest condition) while the highest rating is 5 (best condition). Sediment chemistry is an exception; 0.5 is the lowest rating, 2.5 the highest. This information is used to evaluate conditions at each location as well as to develop an ecological health score for the reservoir. To obtain this score, ratings from all locations are summed and divided by total possible points for the reservoir. The result is then multiplied by 100. The lowest possible score is 20, the highest is 100.

The following chart presents Fort Loudoun Reservoir Vital Signs scores for each year for which data are comparable. Overall ecological health rating was poor in most years. High chlorophyll concentration and low diversity and abundance of benthic

macroinvertebrates contributed to these poor ratings. Dissolved oxygen at the forebay station rated poor in low-flow years (1995, 1999, and 2001). Sediment analysis indicated elevated levels of arsenic, chlordane, and PCBs in 2001. As can be seen in the chart below, ecological health has tended to decline since sampling began in 1991. Meteorological conditions and related changes in reservoir flows associated with the recent drought may account for this decline in reservoir health. Reservoir Vital Signs samples were collected again in 2002, however results are not yet available.



*Bacteriological sampling:* Twelve sites on Fort Loudoun Reservoir were sampled ten times each for fecal coliform bacteria in 2002. All sites met Tennessee's bacteriological criteria for water contact recreation. Tennessee's criteria for water contact recreation requires the collection of at least 10 fecal coliform samples within a 30 day period, with a geometric mean less than 200 fecal coliform colonies per 100 milliliters of water. Samples were collected at the following locations:

Site Name	Location	Type of Site
Ft. Loudoun Day Use Area Beach	TRM 602.4 R	swim
Lenoir City Park Beach	TRM 602.7R	swim
Yarberry Peninsula Boat Ramp	TRM 604.5L	boat ramp
Little Turkey Creek Fishing Pier	TRM 616.5R	boat ramp
Concord Marina (boat dock)	TRM 617.1R	boat ramp
Willow Point Marina	TRM 637L	boat ramp
Poland Creek Recreation Area Swim Site	TRM 620.0L	swim
Gallager Creek Boat Ramp	TRM 612L	boat ramp
Admiral Farragut Park	TRM 622.2R	swim
Louisville Park Beach	TRM 625.4L	swim
Concord Park Beach (the Cove)	TRM 616.5R	swim
Maloney Road Park	TRM 638.9 L	boat ramp

Swimming beaches are sampled every year and boat ramps every other year. Data from this sampling effort is shared in a timely manner with TDEC's Division of Water Pollution Control.

*Fish Flesh Toxic Contaminants:* The State of Tennessee advises against eating catfish from Fort Loudoun Reservoir because of PCB contamination. The state has also issued an advisory against eating largemouth bass weighing more than two pounds and against eating largemouth bass caught in the Litter River embayment. TVA collects channel catfish from the middle section of Fort Loudoun Reservoir annually and fillets are analyzed for selected pesticides and PCBs. Results are provided to state agencies for appropriate action. In the fall of 2002, channel catfish and largemouth bass were collected from the upper, middle and lower sections of Fort Loudoun Reservoir. Catfish will be analyzed for an array of contaminants (including pesticides and PCBs). Largemouth bass will be analyzed for mercury. Results of the 2002 analyses are not yet available.

Further information on Vital Signs Monitoring can be obtained by writing to Tyler Baker at: Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee, 37402 or calling him at 423-876-6733. Email address: [tfbaker@tva.gov](mailto:tfbaker@tva.gov)

*Stream Bioassessment.* The condition of water resources in Fort Loudoun watershed streams is measured using three independent methods; Index of Biotic Integrity (IBI), number of mayfly, stonefly, and caddisfly taxa (EPT), and Habitat Assessment. Not all of these tools were used at each stream sample site.

*IBI:* The index of biotic integrity (IBI) assesses the quality of water resources in flowing water by examining a stream's fish assemblage. Fish are useful in determining long-term (several years) effects and broad habitat conditions because they are relatively long-lived and mobile. Twelve metrics address species richness and composition, trophic structure (structure of the food chain), fish abundance, and fish health. Each metric reflects the condition of one aspect of the fish assemblage and is scored against reference streams in the region known to be of very high quality. Potential scores for each of the twelve metrics are 1-poor, 3-intermediate, or 5-the best to be expected. Scores for the 12 metrics are summed to produce the IBI for the site. The following table associates IBI ranges with attributes of fish assemblages.

Attributes	IBI Range
Comparable to the best situations without influence of man; all regionally expected species for the habitat and stream size, including the most intolerant forms, are present with full array of age and sex classes; balanced trophic structure.	58-60
Species richness somewhat below expectation, especially due to loss of most intolerant forms; some species with less than optimal abundance or size distribution; trophic structure shows some signs of stress.	48-52
Signs of additional deterioration include fewer intolerant forms, more skewed trophic structure (e.g., increasing frequency of omnivores); older age classes of top predators may be rare.	40-44
Dominated by omnivores, pollution-tolerant forms, and habitat generalists; few top carnivores; growth rates and condition factors commonly depressed; hybrids and diseased fish often present.	28-34
Few fish present, mostly introduced or tolerant forms; hybrids common; disease, parasites, fin damage, and other anomalies regular.	12-22

*EPT:* The number and types of aquatic insects, like fish, are indicative of the general quality of the environment in which they live. Unlike fish, aquatic insects are useful in determining short-term and localized impacts because they are short-lived and have limited mobility. The method TVA uses involves only qualitative sampling and field identification of mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Trichoptera) to the family taxonomic level (EPT). The score for each site is simply the number of EPT families. The higher EPT scores are indicative of high quality streams because these insect larvae are intolerant of poor water quality.

*Habitat Assessment:* The quality and quantity of habitat (physical structure) directly affect aquatic communities. Habitat assessments are done at most stream sampling sites to help interpret IBI and EPT results. If habitat quality at a site is similar to that found at a good reference site, any impacts identified by IBI and EPT scores can reasonably be attributed to water quality problems. However, if habitat at the sample site differs considerably from that at a reference site, lower than expected IBI and EPT scores might be due to degraded habitat rather than water quality impacts.



The habitat assessment method used by TVA (modified EPA protocol) compares observed instream, channel, and bank characteristics at a sample site to those expected at a similar high-quality stream in the region. Each of the stream attributes listed below is given a score of 1 (poorest condition) to 4 (best condition). The habitat score for the sample site is simply the sum of these attributes. Scores can range from a low of 10 to a high of 40.

1. Instream cover (fish)
2. Epifaunal substrate
3. Embeddedness
4. Channel Alteration
5. Sediment Deposition
6. Frequency of Riffle
7. Channel Flow Status
8. Bank vegetation protection - Left bank and right bank, separately
9. Bank stability - Left bank and right bank, separately
10. Riparian vegetation zone width - Left bank and right bank, separately

*Sample Site Selection:* EPT sampling and fish community assessment (IBI) are conducted at the same sites. Site selection is governed primarily by study objectives, stream physical features, and stream access. TVA's objective is to characterize the quality of water resources within a sub-watershed (11-digit hydrologic unit). Sites are typically located in the lower end of sub-watersheds and at intervals on the mainstem to integrate the effects of land use. A total of 53 sites have been sampled in the Fort Loudoun watershed since 1995. These sites are typically sampled every five years to keep a current picture of watershed condition.

Details about stream bioassessment sampling sites and scores can be obtained by writing Charles Saylor at Tennessee Valley Authority, PO Box 920, Ridge Way Road, Norris, TN 37828 or calling him at 865-632-1779. Email address: [cfsaylor@tva.gov](mailto:cfsaylor@tva.gov)

## **WATERSHED ASSISTANCE**

### *Coalition Support*

*Citizen Based Organizations:* Citizen based watershed organizations can play a critical role in watershed protection. TVA's watershed teams work to strengthen these organizations by providing assistance in the areas of understanding the local watershed, its conditions, impacts, and threats; developing and implementing strategies to protect or improve resource quality; fundraising; river issues; and organizational development. In 1999, TVA initiated a series of workshops for watershed organizations. Past workshops have covered, state and federal water quality protection programs, grant writing, fund raising, communication/outreach, and strategic planning.

The Little River Watershed Association (LRWA) is a citizen based organization formed to protect and improve the Little River's health through community-based improvement and protection activities. TVA has supported the LRWA by providing financial and technical

assistance. For information about LRWA contact Melissa Nance-Richwine at 865-980-2130.

*Inter-agency Partnerships:* The benefits of watershed partnerships are well documented. No one unit of government, agency, group or individual has all the knowledge, expertise or resources to address all watershed issues. Partnerships can tap a diversity of energy, talent, and ideas. Watershed partnerships can also promote a more efficient use of limited financial and human resources and can identify innovative and efficient means of improving or protecting water quality. The Little Tennessee Watershed Team assists two inter-agency partnerships, the Little River Water Quality Forum and the Knoxville/Knox County Water Quality Forum (KKWQF), with efforts to improve and protect water resources in the Fort Loudoun watershed.

### *Outreach*

*National Clean Boating Campaign:* The National Clean Boating Campaign is a partnership program which highlights the importance of clean water so boating will continue to be fun and safe for future generations. The program demonstrates how boaters can be good stewards of their water environment through best boating and marina practices.

*Clean Marina Initiative:* The Tennessee Valley Clean Marina Initiative is an effort by TVA to promote environmentally-responsible marina practices. This voluntary program, established in support of the National Clean Boating Campaign, helps marina operators protect the resource that provides them with their livelihood.

*WaterFest:* WaterFest is an annual festival designed to educate youth about the many values of water. WaterFest was initiated in 1995 by the KKWQF and has grown into an event with hundreds of elementary and middle school children attending from across Knox County.

*Tennessee Growth Readiness Initiative:* The Tennessee Growth Readiness Initiative (TGRI) is an educational program developed by TVA to teach local officials, and other decision makers about the sources and impacts of nonpoint source pollution, how different land uses affect water quality, and what communities can do to protect water quality. The Little River watershed served as the pilot area for TGRI. Funding for development of TGRI was obtained through a 319(h) grant.

## PROTECTION AND RESTORATION ACTIVITIES

*Promote Best Management Practices:* TVA provides funding and technical expertise to assist with instillation of best management practices (BMPs) that will reduce non-point pollution. TVA also works with partners to promote use of BMPs. In 2002, TVA provided the Blount County Soil Conservation District with funds to develop a "model farm" in the Ellejoy Creek watershed that demonstrates a variety of BMPs. In the summer of 2003, farmers from throughout the watershed will be invited to a tour of this farm. Presentations describing each BMP will be made during the farm tour.

*Environmental Stewardship Program:* The Environmental Stewardship Program is a cooperatively sponsored cost-share program that allows Knox County organizations and citizens access to professional expertise and funding required to implement environmentally friendly solutions to urban non point pollution problems. These solutions include using vegetation and soil bioengineering to stabilize stream banks and grassy swales to collect stormwater runoff and absorb pollutants. Projects also serve as educational opportunities for landscape professionals, contractors, engineers and public works/utility maintenance crews by illustrating how water quantity and erosion problems can be solved while providing tangible benefits to water quality.

*Support Clean Up Efforts:* River Rescue is a community action event that involves hundreds of volunteers. This annual cleanup covers 50 miles of Tennessee River shoreline. River Rescue is in its 14th year. Over the years, River Rescue has attracted 5623 volunteers who picked up 212 tons of debris and 1572 tires.

Clean, Protect and Restore (CPR) is an annual effort lead by CAC AmeriCorps Water Quality Team in conjunction with its KKWQF partners to remove trash from Knox County's streams. CPR has been held each year since 1995. In total, CPR has removed over 166 tons of trash from Knox County's waterways.

The Friends of First Creek (FOFC) is a community-wide effort to reduce the amount of trash and other pollutants entering First Creek and ultimately the Tennessee River. Over 1500 students and 125 teachers from Gresham Middle, Central High and Fulton High Schools have learned about what it takes to protect the health of their watershed and have helped remove over six tons of trash from First Creek over the past three years. FOFC Creek has also educated restaurant owners and managers on what their businesses can do to help safeguard First Creek. Fifteen restaurants in the First Creek Watershed have joined this program. FOFC was initiated by the Tennessee Valley Authority, City of Knoxville, Keep Knoxville Beautiful, Ijams Nature Center, UT Water Resources Center and the CAC AmeriCorps Water Quality Team.

Little River Appreciation Day (LRAD) is an annual event to raise awareness of the value of the Little River. As part of LRAD, volunteers pick-up trash from the banks of the Little River and its tributaries. LRAD co-sponsored by the LRWA and Keep Blount Beautiful.

*Shoreline stabilization:* Between 2000 and 2002, the Little Tennessee Watershed Team successfully stabilized over 11,000 feet of critically eroding reservoir shoreline. Working closely with cooperators and partners, the team has implemented innovative and cost effective methods for minimizing the erosion from these public lands. In addition, the team provides technical assistance to stakeholders through individual landowner meetings and public workshops for those interested in stabilization on private shoreline areas. It is estimated that through these efforts, approximately 2600 tons of sediment has been kept from entering the reservoir system. Additional stabilization is scheduled for 2003.

*Promote Riparian Buffers:* An effective line of water quality protection is maintaining the vegetative plant cover along waterbodies. TVA encourages waterfront property owners to maintain or establish vegetated riparian buffers by providing information and materials to the riparian property owner. In 2002, TVA partnered with the Little River Watershed

and the City of Maryville to sponsor a riparian buffer workshop. Packages of 50 of native riparian plant seedlings were distributed to riparian property owners in the Little River watershed. TVA has also developed a series of 11 fact sheets that will enable riparian property owners to restore, manage, and be better stewards of riparian land. The fact sheets will be available on the TVA internet site (<http://www.tva.com/river/landandshore/index.htm>) in March, 2002.

*Integrated Pollution Source Identification System:* Integrated Pollution Source Identification (IPSI) system is a GIS database and set of analysis tools developed by TVA environmental engineers and remote sensing specialist to help plan and implement watershed restoration efforts. IPSI is based on interpretation of color infrared photography. In 2002, IPSI systems were completed for Blount County and the Little River Watershed. This project was made possible by funding from The Tennessee Valley Authority, Blount County, Knox County, and the 319(h) grant program. IPSI is being used to support several ongoing or planned water quality improvement efforts.

Further information on TVA's Watershed Assistance activities in the Fort Loudoun Watershed can be obtained by writing the Little Tennessee Watershed Team at: Tennessee Valley Authority, 804 Highway 321 North (HWY 1A-LCT), Lenoir City, TN 37771-6440 or calling them at 865/988-2420.

**5.2.E. National Park Service.** Great Smoky Mountains National Park (GSMNP) is rich with nearly 3,400 kilometers (2,100 miles) of cool and cold-water stream habitats. Of this total, 1,280 km (800 miles) support a diverse fish community. Large stream systems (4<sup>th</sup>-5<sup>th</sup> order) support the greatest diversity of fishes in GSMNP, including 12 families and over 60 species. Many of the fish species found in these large stream systems are excellent indicators of natural and anthropogenic environmental impacts. Large stream systems in GSMNP are sampled each fall in an attempt to provide a snapshot of the diversity of habitat and fish species found in the Park's larger stream systems. Backpack electrofishing gear and three-pass depletion estimates are used to evaluate year-class strength, reproductive success, density (# fish/100m<sup>2</sup>), biomass (kg/ha), and other trend information.

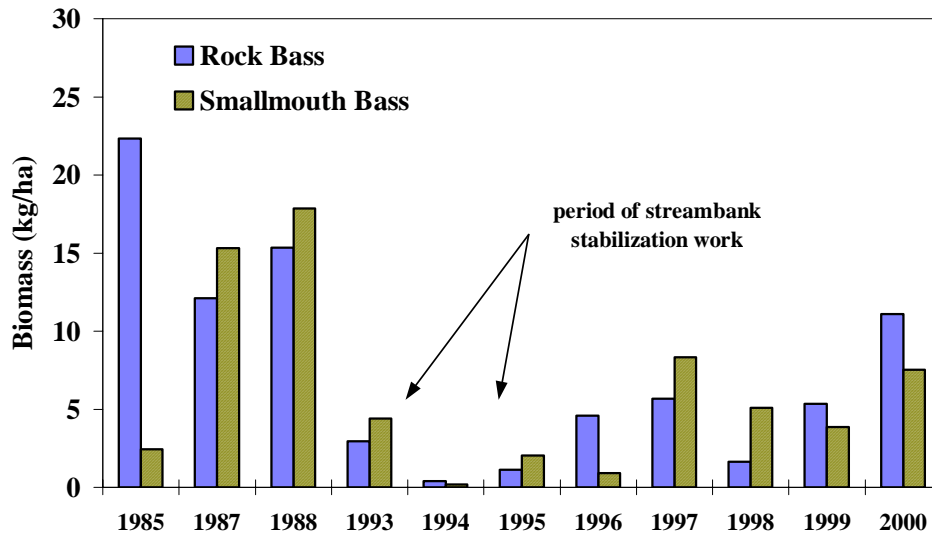
Four of the Park's large stream systems were sampled in 2000: Abrams Creek, Cataloochee Creek, Hazel Creek, and Straight Fork. A comparison of current and historic US Fish and Wildlife Service (USFWS) monitoring data of species composition among these large stream sites has not significantly changed since the early 1970's. Species richness in the Park's large stream systems indicates excellent habitat and water quality conditions in nearly every stream. Elevation and habitat differences among sites account for most of the species variability.

Despite a high degree of annual variation, analysis of monitoring data from 1990-2000 indicates no long-term trends in sensitive species such as trout and dace. Three years of consecutive drought conditions have reduced many populations by as much as 50%, but population and community structures remain stable. In 2000, brown and rainbow trout densities ranged from 1.1-7.0 fish/100m<sup>2</sup> (~24-1,352 fish/mile) and 4.1-30.5 fish/100m<sup>2</sup> (600-9,112 fish/mile) respectively, throughout GSMNP. Young-of-year (YOY) brown trout comprised between 33-93% brown trout collected in 2000 large stream samples indicating a strong year class for brown trout in GSMNP. However, only 19-

50% of all rainbow trout collected during 2000 were YOY rainbow trout, which is slightly below average for large streams in GSMNP. Annual changes in density and biomass indicate annual variation in these populations is mainly due to abiotic events such as droughts and floods. Young-of-year trout production is indirectly related to the timing and magnitude of severe flood events ( $>1000 \text{ ft}^3/\text{sec}$ ).

Rainbow trout typically live 3-4 years in the Park, while an occasional 5-year-old fish is collected. Historic data indicate annual mortality rates for rainbow trout in GSMNP ranges from 60-70% from ages 1-4. Brown trout typically live 5-8 years with an occasional fish living to 12 years of age. Most rainbow trout average 4-10 inches with an occasional fish reaching 14 inches. Most brown trout average 6-14 inches with an occasional fish reaching 25 to 30 inches and 8-10 pounds.

Smallmouth bass and rock bass biomass continued to increase in Abrams Creek (Figure 5-1) during 2000, indicating these species continue to recover following sediment and flood impacts during the early 1990's. Reduction in sediment inputs appears to be related to streambank restoration and fencing projects (1993-1994) which eliminated cattle access to streams in Cades Cove and reduced erosion. Both species also demonstrated good reproduction in 2000 indicating that sediment which may have previously impacted spawning habitat may have been reduced. Data indicate that many of the riffle species (i.e. darters) which live in areas unaffected by sediment inputs have remained relatively stable throughout the 1990-2000 period.



**Figure 5-1. Summary of rock bass and smallmouth bass biomass (kg/ha) from Abrams Creek large stream sampling efforts between 1985 and 2000.** Samples were not conducted in 1986 and 1989-1992 due to inadequate funding and manpower. This site was added to the annual monitoring scheme in 1993 to assess streambank stabilization and water quality improvement efforts in Cades Cove. Note that biomass estimates for 1985, 1987, and 1988 are elevated because standardized protocols were not in place resulting in an insufficient number of electrofishing units being used given the size of the stream.

The aquatic macroinvertebrate component of the Inventory and Monitoring program has been operating in the park since 1992. This aspect of the program is designed to provide data on the health of streams and aquatic biodiversity, and to determine relationships among macroinvertebrates, fishes, and water quality. In addition to this program, the park also is making headway in a comprehensive, systematic inventory of all invertebrates, as well as all other life forms, with the All Taxa Biodiversity Inventory (ATBI). The park's goals are to (a) discover all species in the park, (b) compile natural history information on each species, (c) map species distributions in the park, and (d) organize the information and make it available to the general public as well as the scientific community.

There are an estimated 76,000 species of invertebrates in the park, of which 4,280 currently are known. Aquatic invertebrates are the best-known group since the park has an Inventory and Monitoring component dealing specifically with them. Other invertebrate groups have received attention from specialists and therefore have distributional and other ecological data compiled for them. However, excluding the aquatic fauna, very few of the park's invertebrate distributions are known and most groups are not even at the simple "checklist" stage.

For aquatic macroinvertebrates, annual stream samples are collected from 27 permanent sites to permit comparisons of the health of these sites from year to year. Annual samples are taken from another 15 sites on a rotating basis to provide wider coverage of streams in the park. Complete coverage of the more than 3,400 km (2,100 miles) of streams in the park is a long-term objective.

Biotic Index (BI) values, which are based on species tolerance values and abundance class, have been calculated for each site. Tolerance values are determined in large-scale studies of species in a range of water quality conditions. A species that is found only in pristine, unpolluted water is considered intolerant, whereas a species that occurs in polluted waters is considered tolerant. A value is assigned that ranges from zero (most intolerant) to ten (most tolerant). The combined values are summed over all species and converted to a site value. Over the years (1992-2001), there has been a tendency for the BI to remain stable or, in some cases, increase (improve) which probably signifies increased sampling efficiency. EPT (Ephemeroptera, Plecoptera, Trichoptera) indices also have been calculated, and generally are very similar to the BI or occasionally higher. Final Rapid Bioassessment scores for each site, based on BI and EPT values, have generally been in the 'good' to 'excellent' categories, except in areas with Anakeesta rock formations (pyritic slate) or in mine drainage areas.

Analysis of monitoring data for aquatic invertebrates reveals a continuing rapid increase in the number of new taxa encountered each year. Over the years, a total of nearly 500 taxa has been documented in streams and the species accumulation curve is still climbing, indicating that there are many more taxa yet to be encountered. Many of the threats affecting the integrity of the park as a whole, such as nitrate deposition, directly affect native invertebrates. Park streams are subject to runoff from precipitation that deposits some of the highest total nitrate and sulfate levels in the nation. A single storm may acidify streams at high elevations in the park by more than a full pH unit. Thus, the biota of streams are subject to high levels of pollution, and the impaired health of these streams will be seen in the responses of the aquatic biota. As intolerant species are

replaced by tolerant species, the trend in the biotic index will begin to slant downward. Such trends may be among the earliest indications of biotic effects of pollution in aquatic ecosystems in the park.

Thousands of species of invertebrates in the park remain undiscovered and undescribed. With the inception of the ATBI, many will be discovered, and a tremendous amount of additional data will be accumulated. Doubtless many invertebrate species have been (and will continue to be) affected by extensive and/or intensive threats. The ATBI will provide the knowledge necessary to make better-informed management decisions in the effort to preserve the greatest number of resources. Although there is a widespread belief among park visitors that all information is known about species in the park, sustained inventory work and the continuation of long-term monitoring programs over a period of years will be necessary to reach that level of knowledge.

For more information on biological monitoring, contact the Great Smoky Mountains National Park at [grsm\\_smokies\\_information@nps.gov](mailto:grsm_smokies_information@nps.gov).

### **5.3. STATE PARTNERSHIPS.**

**5.3.A. TDEC Division of Water Supply.** The Source Water Protection Program, authorized by the 1996 Amendments to the Safe Drinking Water Act, outline a comprehensive plan to achieve maximum public health protection. According to the plan, it is essential that every community take these six steps:

- 1) Delineate the drinking water source protection area
- 2) Inventory known and potential sources of contamination within these areas
- 3) Determine the susceptibility of the water supply system to these contaminants
- 4) Notify and involve the public about threats identified in the contaminant source inventory and what they mean to their public water system
- 5) Implement management measures to prevent, reduce or eliminate threats
- 6) Develop contingency planning strategies to deal with water supply contamination or service interruption emergencies (including natural disaster or terrorist activities).

Source water protection has a simple objective: to prevent the pollution of the lakes, rivers, streams, and ground water (wells and springs) that serve as sources of drinking water before they become contaminated. This objective requires locating and addressing potential sources of contamination to these water supplies. There is a growing recognition that effective drinking water system management includes addressing the quality and protection of the water sources.

Source Water Protection has a significant link with the Watershed Management Program goals, objectives and management strategies. Watershed Management looks at the health of the watershed as a whole in areas of discharge permitting, monitoring and protection. That same protection is important to protecting drinking water as well. Communication and coordination with a multitude of agencies is the most critical factor in the success of both Watershed Management and Source Water Protection.

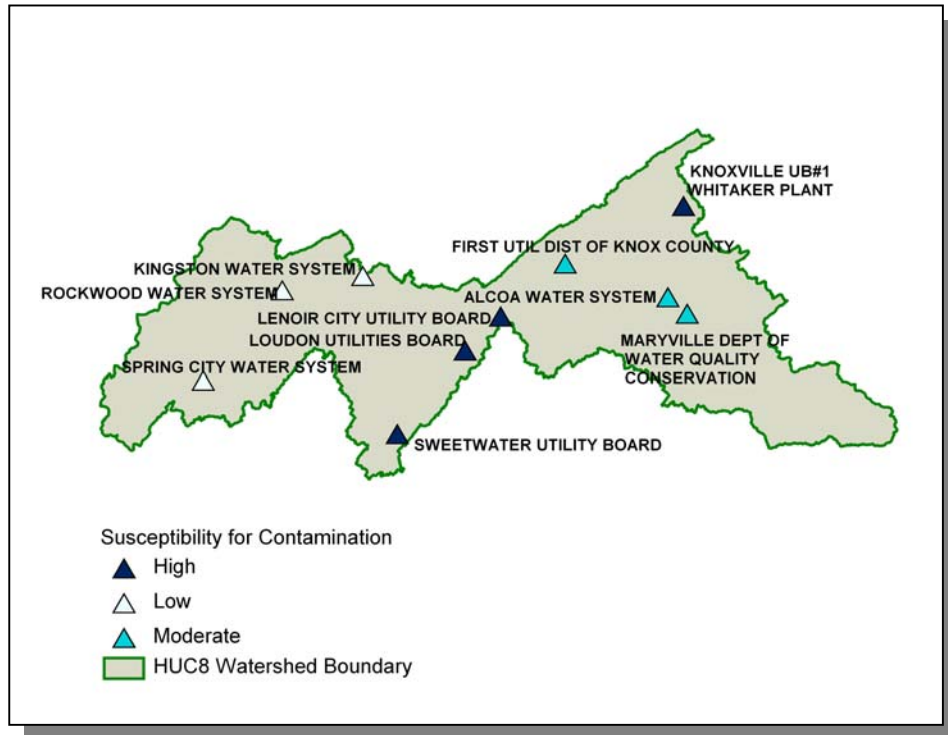
Watershed management plays a role in the protection of both ground water and surface water systems. Watershed Management is particularly important in areas with karst {limestone characterized by solution features such as caves and sinkholes as well as disappearing streams and spring} since the differentiation between ground water and surface water is sometimes nearly impossible. What is surface water can become ground water in the distance of a few feet and vice versa.

Source water protection is not a new concept, but an expansion of existing wellhead protection measures for public water systems relying on ground water to now include surface water. This approach became a national priority, backed by federal funding, when the Safe Drinking Water Act amendments (SDWA) of 1996 were enacted. Under this Act, every public drinking water system in the country is scheduled to receive an assessment of both the sources of potential contamination to its water source of the threat these sources may pose by the year 2003 (extensions are available until 2004). The assessments are intended to enhance the protection of drinking water supplies within existing programs at the federal, state and local levels. Source water assessments were mandated and funded by Congress. Source water protection will be

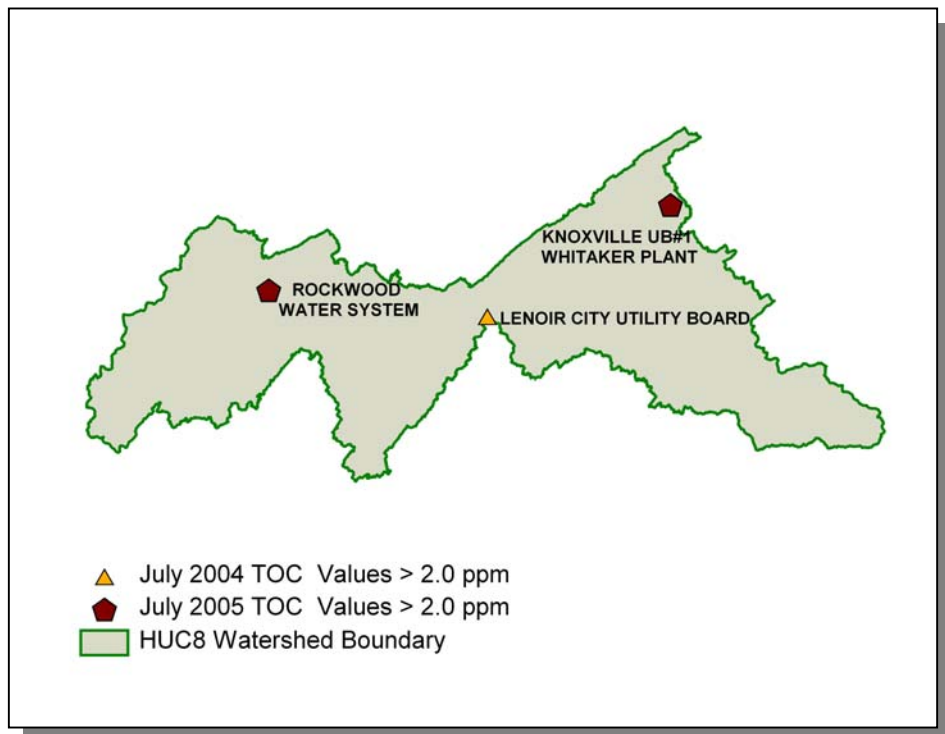


left up to the individual states and local governments without additional authority from Congress for that progression.

As a part of the Source Water Assessment Program, public water systems are evaluated for their susceptibility to contamination. These individual source water assessments with susceptibility analyses are available to the public at <http://www.state.tn.us/environment/dws> as well as other information regarding the Source Water Assessment Program and public water systems.



**Figure 5-2. Susceptibility for Contamination in the Ft. Loudoun/Watts Bar Lake Watershed.**



**Figure 5-3. July 2004 and 2005 Raw Water Total Organic Carbon (TOC) Analysis in the Ft. Loudoun/Watts Bar Lake Watershed.**

For further discussion on ground water issues in Tennessee, the reader is referred to the Ground Water Section of the 305(b) Water Quality Report at <http://www.tdec.net/water.shtml>.

**5.3.B. State Revolving Fund.** TDEC administers the state's Clean Water State Revolving Fund Program. Amendment of the Federal Clean Water Act in 1987 created the Clean Water State Revolving Fund (SRF) Program to provide low-interest loans to cities, counties, and utility districts for the planning, design, and construction of wastewater facilities. The U.S. Environmental Protection Agency awards annual capitalization grants to fund the program and the State of Tennessee provides a twenty-percent funding match. TDEC has awarded loans totaling approximately \$550 million since the creation of the SRF Program. SRF loan repayments are returned to the program and used to fund future SRF loans.

SRF loans are available for planning, design, and construction of wastewater facilities, or any combination thereof. Eligible projects include new construction or upgrading/expansion of existing facilities, including wastewater treatment plants, pump stations, force mains, collector sewers, interceptors, elimination of combined sewer overflows, and nonpoint source pollution remedies.

SRF loan applicants must pledge security for loan repayment, agree to adjust user rates as needed to cover debt service and fund depreciation, and maintain financial records that follow governmental accounting standards. SRF loan interest rates range from zero percent to market rate, depending on the community's per-capita income, taxable sales, and taxable property values. Most SRF loan recipients qualify for interest rates between 2 and 4 percent. Interest rates are fixed for the life of the term of the loan. The maximum loan term is 20 years or the design life of the proposed wastewater facility, whichever is shorter.

TDEC maintains a Priority Ranking System and Priority List for funding the planning, design, and construction of wastewater facilities. The Priority Ranking List forms the basis for funding eligibility determinations and allocation of Clean Water SRF loans. Each project's priority rank is generated from specific priority ranking criteria and the proposed project is then placed on the Project Priority List. Only projects identified on the Project Priority List may be eligible for SRF loans. The process of being placed on the Project Priority List must be initiated by a written request from the potential SRF loan recipient or their engineering consultant. SRF loans are awarded to the highest priority projects that have met SRF technical, financial, and administrative requirements and are ready to proceed.

Since SRF loans include federal funds, each project requires development of a Facilities Plan, an environmental review, opportunities for minority and women business participation, a State-approved sewer use ordinance and Plan of Operation, and interim construction inspections.

For further information about Tennessee's Clean Water SRF Loan Program, call (615) 532-0445 or visit their Web site at <http://www.tdec.net/srf>.



**Figure 5-4. Location of Communities Receiving SRF Loans or Grants in the Group 2 Portion of the Fort Loudoun Lake Watershed.** More information is provided in Fort Loudoun-Appendix V.

**5.3.C. Tennessee Department of Agriculture.** The Tennessee Department of Agriculture's Water Resources Section consists of the federal Section 319 Nonpoint Source Program and the Agricultural Resources Conservation Fund Program. Both of these are grant programs which award funds to various agencies, non-profit organizations, and universities that undertake projects to improve the quality of Tennessee's waters and/or educate citizens about the many problems and solutions to water pollution. Both programs fund projects associated with what is commonly known as "nonpoint source pollution."

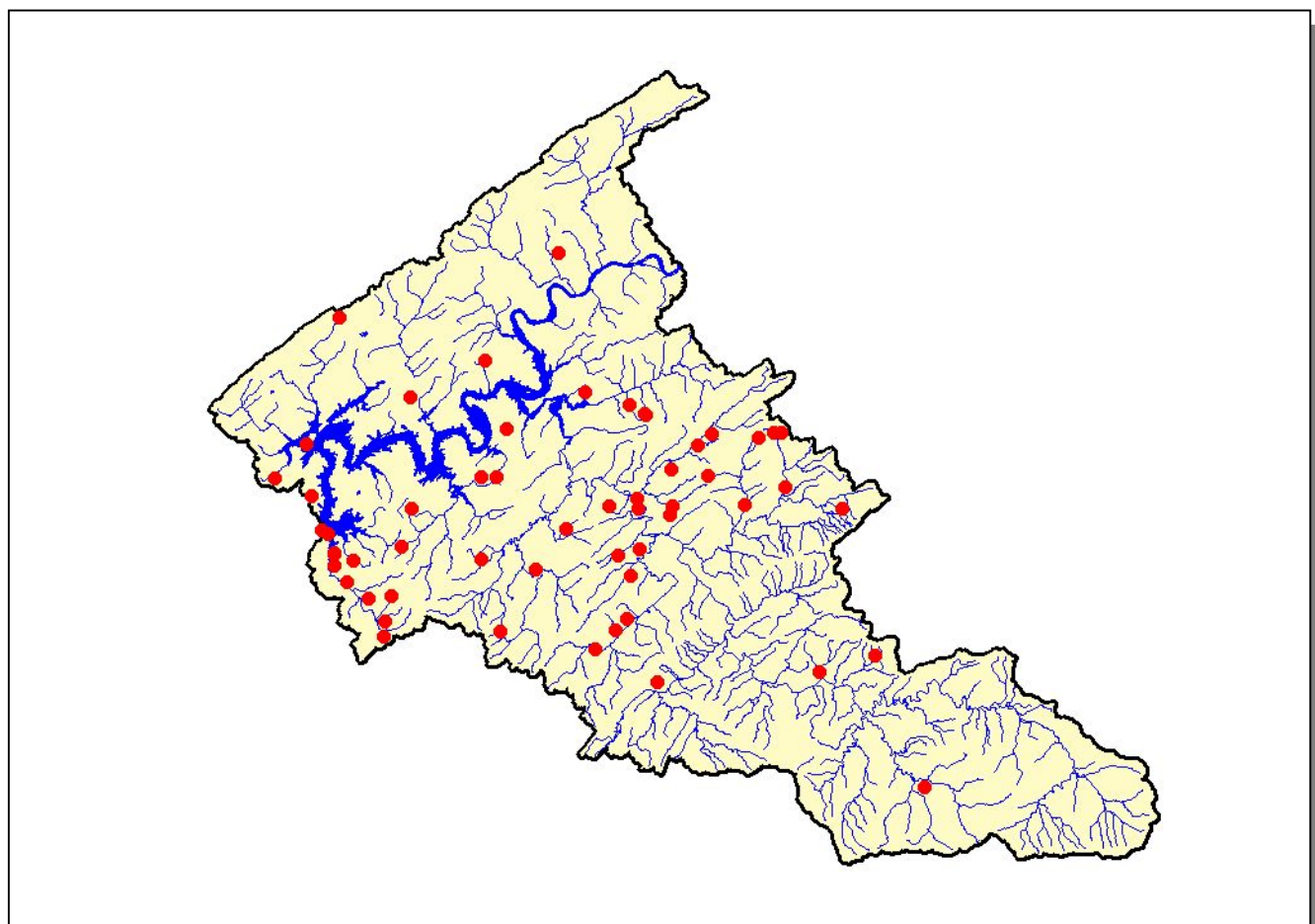
The Tennessee Department of Agriculture's Nonpoint Source Program (TDA-NPS) has the responsibility for management of the federal Nonpoint Source Program, funded by the US Environmental Protection Agency through the authority of Section 319 of the Clean Water Act. This program was created in 1987 as part of the reauthorization of the Clean Water Act, and it established funding for states, territories and Indian tribes to address NPS pollution. Nonpoint source funding is used for installing Best Management Practices (BMPs) to stop known sources of NPS pollution, training, education, demonstrations and water quality monitoring. The TDA-NPS Program is a non-regulatory program, promoting voluntary, incentive-based solutions to NPS problems. The TDA-NPS Program basically funds three types of programs:

- **BMP Implementation Projects.** These projects aid in the improvement of an impaired waterbody, or prevent a non-impaired water from becoming listed on the 303(d) List.
- **Monitoring Projects.** Up to 20% of the available grant funds are used to assist the water quality monitoring efforts in Tennessee streams, both in the state's 5-year watershed monitoring program, and also in performing before-and-after BMP installation, so that water quality improvements can be verified. Some monitoring in the Fort Loudoun Lake Watershed was funded under an agreement with the Tennessee Department of Agriculture, Nonpoint Source Program, and the U.S. Environmental Protection Agency Assistance Agreements C9994674-98-1, C9994674-99-0, C9994674-00-0, and C9994674-01-0.
- **Educational Projects.** The intent of educational projects funded through TDA-NPS is to raise the awareness of landowners and other citizens about practical actions that can be taken to eliminate nonpoint sources of pollution to the waters of Tennessee.

The Tennessee Department of Agriculture Agricultural Resources Conservation Fund Program (TDA-ARCF) provides cost-share assistance to landowners across Tennessee to install BMPs that eliminate agricultural nonpoint source pollution. This assistance is provided through Soil Conservation Districts, Resource Conservation and Development Districts, Watershed Districts, universities, and other groups. Additionally, a portion of the TDA-ARCF is used to implement information and education projects statewide, with the focus on landowners, producers, and managers of Tennessee farms and forests.

Participating contractors in the program are encouraged to develop a watershed emphasis for their individual areas of responsibility, focusing on waters listed on the Tennessee 303(d) List as being impaired by agriculture. Current guidelines for the TDA-ARCF are available. Landowners can receive up to 75% of the cost of the BMP as a reimbursement.

Since January of 1999, the Department of Agriculture and the Department of Environment and Conservation have had a Memorandum of Agreement whereby complaints received by TDEC concerning agriculture or silviculture projects would be forwarded to TDA for investigation and possible correction. Should TDA be unable to obtain correction, they would assist TDEC in the enforcement against the violator. More information about the joint policy to address Bad Actors in forestry operations is available at <http://www.state.tn.us/environment/news/release/jan99/badact.htm>



*Figure 5-5. Location of BMPs installed from 1999 through 2002 in the Group 2 Portion of the Fort Loudoun Lake Watershed with Financial Assistance from the Tennessee Department of Agriculture's Nonpoint Source and Agricultural Resources Conservation Fund Grant Programs.*



## **5.4. LOCAL INITIATIVES.**

**5.4.A. Tennessee Izaak Walton League.** The Tennessee Izaak Walton League has been working for clean water, wildlife and public lands since its founding in 1977. In June, 2000 offices were established on the Knoxville Waterfront, staffed by seven full time professional staff. We also employ several part time employees and utilize the services of student interns from area universities and colleges while managing a base of more than 400 volunteers. Our goals are centered around finding solutions to problems caused by trash and debris, silt and sewage that impact the waters of an eight county region served by our Clean Water Center. Five of these counties, Jefferson, Sevier, Knox, Blount and Loudon are in the Fort Loudoun Lake Watershed.

We work closely and in cooperation with citizens, corporations, city, county, state and federal agencies and other conservation/environmental organizations. Our working policy is to avoid conflict, work behind the scene taking a common sense approach to finding solutions to water quality problems. Although we do real work on a daily basis, we also focus on providing a bridge between citizens and corporations or governmental agencies and function as a catalyst to foster cleaner water.

We participate in the annual River Rescue sponsored by Ijams Nature Center. Last year, we recovered 120 tires and some 100 bags of trash along with many other large items off the lakeshore at Craigs Cove.

**Facility:** We maintain fully equipped, seven room, office and a 20X70 foot boat slip, with three work boats and six canoes at the Volunteer Landing Marina on Knoxville's Waterfront. All staff have computers that are networked to a high speed laser black and white printer and a high definition color printer. We have full mapping services provided to us by the City of Knoxville and TVA.

**Staff:** We have seven degreed professionals each of whom is responsible for a division of our work, is assigned the lead on various projects, and is assisted by other staff members from which teams are built to accomplish certain aspects of each project. Full time staff, and areas of expertise, are an Executive Director (Nelson Ross), Director of Operations (Alicia Kelley), Water Resources Project Manager (Ben Ramsbottom), Wildlife and Riparian Specialist (Mark Campen), Education Director and Wetlands Specialist (Dana Ball), Fisheries Biologist and Stream Ecologist (Robert Sain), and Erosion Control Specialist (Robert Toole).

**Funding:** We are funded through grants from foundations, counties, cities, state and federal agencies; supplemented by private donations.

**Watershed Focus:** Our clean water focus in the Fort Loudoun Lake Watershed is on trash and debris, sewage and silt. Here is a brief description of the nature of the work we do in each area:

**Trash and Debris:** We have been tracking the flow of trash and debris into Fort Loudoun Lake since 1997, established the First Creek First study in 1999 to do a concentrated study of trash flow from urban streams. We have observed and recorded the flow of woody debris into the lake since 2000.

The First Creek First Study developed a data base for nine categories of trash based on the standards used by Keep America Beautiful. We found that the flow of trash can be reduced significantly from streams into lakes by concentrating on litter control at sites where roads cross are proximal to the water. Also, by using a series of floating skimmers across the stream successfully collects floating trash so it can be extracted using dip nets with extended poles. Combined with litter education programs using this information and techniques, stream litter can be controlled, if addressed on a weekly basis. We have observed that annual litter clean ups, although important, seem to have little effect on the amount of trash entering lakes from streams.

Observations of the floating woody debris have revealed a pattern of many very large trees, some with foliage, entering the lake and causing considerable problems related to boat damage, clogging docks and coves and generally creating a nuisance to water recreation. We have found that major sources of these trees, in order of impact, are streambank erosion in the Holston River, lake shoreline erosion, residual action of raising and lowering of lake levels that redistribute logs collected historically in the lake and streambank erosion in the French Broad River. In addition, large mats of smaller woody debris washes in from the upper reach of the lake where the two rivers come together. Our work crews deal with these problems by identifying areas of river streambank erosion that can be improved, pulling floating trees from the lake and securing them to shore. We use these trees not only for shoreline erosion control, but as a way to attract fish. In constructing the latter we work inside the permitting required by the Corps of Engineers and the Tennessee Valley Authority and with the landowner's approval. We remove litter from the large floating mats of woody debris and break them into smaller masses, when possible.

Sewage: Many area streams listed on the 303(d) list as "Not Supporting" have sewage impacts listed as a major pollution source. We have developed the expertise needed to monitor Sanitary Sewage Overflows (SSO's), collect related data and document the location, amount of flow, time of flow and the stream impacted by the sewage. In reporting this information, we deal with utilities, TDEC, EPA, City and County agencies who have a responsibility to respond and correct the problem. We do not report these SSO's to the media. However, we do counsel citizens about the nature of the impact and advise them on actions they may want to take related to the problem.

Silt: Siltation causes the most pollution to the watershed. It comes from agriculture, construction and the erosion of streambanks and lakeshore. We have staff trained in erosion control who report problem locations that are illegal to the proper regulatory agency and track the enforcement action. Also, we offer erosion control services to contractors who request assistance.

Our first objective is erosion prevention. To do this, we have discussions with developers and contractors prior to construction activities. Second, we educate the public about the need to report dirty water or soil washing into stormdrains from construction sites. Streambank and lake shoreline erosion projects are triggered by observations made by staff or as they are reported by citizens. Restoration of these sites are done under grant or private funding as separate projects. Currently (early 2003) we have seven sites being serviced. One is a cooperative effort with Trout Unlimited, Tennessee Wildlife Resources Agency, Tennessee Valley Authority and others on the Clinch River below Norris Dam Tailwaters. Another is on Williams Creek in Knoxville, funded by a grant



from the Tennessee Department of Agriculture, Nonpoint Source Program (EPA 319 money). Citizen education is a major element in protecting and restoring streambank and shoreline erosion. The Tennessee Wildlife Resources Agency provides some annual funds that allow us to provide service in citizen education type programs.

*General Information:* In addition to the above activity, we remove dead cattle and other animals that interfere with water recreation or create health risks, and monitor water for containers or leaks of toxic waste. In addition, we track abandoned sunken boats and illegally docked and facilitated houseboats in the rivers and lake, reporting them to the agency responsible for enforcement. Wildlife study and observation is promoted as a key to understanding ecology and the effects of water pollution on wildlife. We are contracted to do an Index of Biotic Integrity (IBI) on seven urban streams in the City of Knoxville and use each report to guide future rehabilitation and education projects. Our Education Director has active programs with schools on wetland study and conservation and our Wildlife Specialist, has developed a program called "Birds and the Trees" that teaches citizens about the relationship between birds, trees and water. We also promote birdhouse construction to help teach that bird ecosystems along riparian zones are essential to good water quality.

*Concluding Comments:* Although we believe that addressing water quality problems through the watershed approach is the best way to improve and protect water quality, more emphasis needs to be placed on growing the number of organizations involved. The needs are just too great to be served by the relatively few demonstration projects that are out there. Neither funding nor staffing is the problem in doing this. We feel that promoting sustainability, uniformly, is where water quality comes up short. All of us must find a way, together, to get this job done or we will continue to fight a major losing battle for clean water.

More information is available on the Tennessee Izaak Walton League web site at:

<http://www.tnike.com>

**5.4.B. Little River Watershed Association.** The Little River Watershed Association was formed in 1998 to bring together people with common interests in the river--those who:

- live by the river
- enjoy the river for recreation and scenic beauty
- treasure the river's rich historical value
- depend on the river for their livelihood
- study and teach about the river, and
- make decisions that impact the river

The Little River Watershed Association is a non-profit organization with the mission *to protect, preserve, and enhance the Little River and its tributaries through mobilizing public support, building public awareness and promoting best management practices.* The key aims of the Association are to promote educational activities that benefit the river and the watershed; to focus attention on efforts to protect the river; to distribute current information to the community; and to assist citizens in taking positive action.

The Association's activities include:

- An educational program delivered in area schools
- Presentations to school, church, and community groups
- Hosting public forums and "expert" panel discussions
- Co-sponsoring native plant workshops
- Organizing a Spring river cleanup
- Managing an educational multi-media kiosk that travels to area businesses and public places throughout the watershed
- Assisting local, state and federal agencies and other groups working to protect the Little River
- Hosting canoe trips along the river for area government & business leaders
- Participating in the National RiverSmart media campaign
- Participating in stream bank planting projects along Alcoa & Maryville's Greenway
- Hosting the annual Little River Awareness Day

The Little River Watershed Association is a volunteer citizen's organization open to anyone sharing the aims of the organization. The Association receives technical guidance from water quality professionals who participate in the Little River Water Quality Forum. Currently staffed by two part-time workers, the Little River Watershed Association offices are located at 1004 East Lamar Alexander Parkway, Maryville, Tennessee 37804.

Voice: 865-980-2130

Fax: 865-980-2129

E-mail: [littleriverwatershed@hotmail.com](mailto:littleriverwatershed@hotmail.com)

Web: <http://www.littleriverwatershed.org>

**5.4.C. Blount County Planning Commission.** The Blount County Planning Commission adopted a county-wide Water Quality Plan April 24, 2003. The Plan contains both policies and an implementation agenda which were developed after extensive public participation. The Blount County Planning Department conducted 22 citizen input workshops at community sites throughout the county in support of the plan. A total of 189 citizens participated fully in the workshops. The County Commission also appointed a Citizen Advisory Committee to aid on formulation of the Plan

The planning process and particularly the workshops were supported by an education module developed for the Tennessee Growth Readiness project of the Tennessee Valley Authority and the Tennessee Department of Agriculture. Blount County was a pilot community for testing the education module. The planning process was also supported by research under the Integrated Pollution Source Identification project by the Tennessee Valley Authority.

A copy of the Blount County Water Quality Plan can be accessed at <http://www.blount.state.tn.us/planning/> along with results of the citizen input workshops. For more information, contact Mr. John Lamb at [planning@mail.blount.state.tn.us](mailto:planning@mail.blount.state.tn.us).